

## Donald E. Bently Accepts the Decade Award from the Vibration Institute

**T**hank you very much for the Decade Award. It is a real pleasure. It is also a great surprise since I have many heroes in the field of machinery vibration and rotor dynamics that I would have chosen instead of myself. Most of these people are still with us. In many countries of the world, I can easily name several people in industry or in academia that I look to as my senior in capability. In the United States, there are many people that I would have chosen first.

This year has been especially bountiful. In addition to this great honor, in January, the Academy of Engineers in St. Petersburg, Russia elected me as a Foreign Member. The Russians are pleased to see a researcher in machinery behavior who is a businessman. I think that is why they elected me.

I have been working on the mechanism of rotating stall but so far have not been fully successful. There are many papers on rotating stall-induced vibration that have been published in the last ten years. They seem to conclude that there are two types, one at a lateral resonance frequency that is self-excited and one at a much lower ratio to rotative speed that is forced. I do not agree. I can show mathematically that it is possible for both to be self-excited; unfortunately, I do not yet have a laboratory or field example to prove the point.

Nevertheless, I have been lucky enough to be successful in some other areas. Plus and minus spectrum observation is doing well and should improve our ability to observe symptoms of malfunctions. Modal probes to show flexible rotor vibration are doing extremely well. Measurement of Direct Dynamic Stiffness and Quadrature Dynamic



Ronald L. Eshleman, Director of the Vibration Institute (left), presents the Decade Award to Donald E. Bently

Stiffness is progressing as if chained to a rock, but they are coming along well considering the great paradigm shift they represent. Root locus methodology is progressing well, and Engineer Assist, an "expert system" for support to machinery engineers, is doing well.

Just to keep the record correct, there are many things in this field that I have popularized but not invented. I have always been a "second-hander," learning from others preceding me. Perhaps this is the general nature of things. It is really extremely rare that something totally original can be done.

Typically, Orbits were done by Newkirk the year I was born. Polar plots were done by Bishop (and probably others) on machinery resonances in the early 60's. In fact, Polar plots were quite popular for control system work (the area where I specialized) long before that.

The Keyphasor® was used by Stone and Underwood in their oil whip work

in the mid 40's. The Digital Vector Filter does mathematically the fundamental job of convolution that Thearle introduced in his excellent balancing work from the 30's. I could continue this list, but perhaps the point is clear.

Edison claimed that he was a commercial developer, not an inventor. In his case, I only partially agree, but in my case, for sure, I do commercial development. I am not belittling this; I am proud of it. I hope it has helped my neighbors materially and culturally.

Across a fifth of a century, the Vibration Institute, with the leadership of Ron Eshleman, has made strong contributions to the knowledge of machinery vibration problems and the control of these problems. The Vibration Institute, by way of its seminars, plus local, national, and international chapters, provides a forum where machinery engineers can meet to discuss common problems and possible solutions.

In the past twenty years, there have been great improvements in both the design of rotating machinery and the operation of machinery. I am pleased to have helped with the tools and methodology for the observation of vibrations and with the processing of the performance data.

In the future, many more changes and improvements in the machinery and in the observation of this machinery will occur. Machines that are totally sealed are now being built and installed. Machines with better efficiency, longer life, lower cost, and higher performance are certain to evolve. The science of the measurement of vibration must also evolve to match this. I hope to continue contributing to this area, and I am certain that the Vibration Institute and its members will continue to strengthen this vital field of vibration observation and interpretation.

Set ahead of strategy is vision. My vision is usually something like, "Here is something that is useful to the world," and then, "Here is a way to do it." Often the driving force, to me, of vision is pure curiosity: I do it simply to find out if it can successfully be done, providing it meets the usefulness test. ■